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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • APRIL 15, 1944



Geologically Mild
See Page 255

A SCIENCE SERVICE PUBLICATION



IT HELPED WIN A GREAT BATTLE

Sealed in this box and deposited in the vaults of the Bell Telephone Laboratories is a special device that helped win a great battle. It is being preserved for its historical significance.

SUCH things do not just happen. New instruments of war may appear suddenly on the battle-fronts. But behind them are long years of patient preparation.

Our scientists were organized to have this device ready for battle—just as our fighting forces were organized to be ready for that battle.

Developing secret military devices is a big job but big forces are busy on it, day and night.

Concentrating on this job are more than 7000 people in the Bell Telephone Laboratories. Its scientists and engineers and their skilled associates form a highly organized team, experienced in working things out.

Today's work for war had its beginning many years ago when these laboratories were founded as part of the Bell System's service to the public.

BELL TELEPHONE SYSTEM



CHEMISTRY

Chemistry on the Home Front

New mold treatment for obtaining more alcohol, sulfa drug which may aid one type of shock, production of fuels from plants among subjects at meeting.

► AMERICAN CHEMISTS discussed all phases of chemistry at the 107th national meeting of the American Chemical Society in Cleveland. Here, on pages 243-247 and 252-253 of this SCIENCE NEWS LETTER, are stories on some of the papers presented as reported by Dr. Frank Thone, Science Service's representative at the meeting:

More Alcohol for War

► MORE ALCOHOL for smokeless powder, synthetic rubber and the thousand other uses of war can be produced from a given quantity of grain through a new mold treatment than with the traditional malting method, M. Roberts, S. Laufer, E. D. Stewart and L. T. Saletan of the Schwarz Laboratories, New York City, disclosed in a paper presented before the meeting of the American Chemical Society in Cleveland.

Before grain can be turned into alcohol, its starch must be converted into sugar. This has long been done by treating it with malt, which contains a digestive ferment or enzyme. It has been discovered, however, that a species of mold, a botanical cousin of the one that produces penicillin, turns out a superior kind of enzyme which turns the starch into sugar more rapidly and completely than the time-honored malt. This mold is cultivated on masses of bran, dried and ground up before being added to the grain mash.

The four chemists making the report stated that the increase in alcohol yield under the mold-bran method amounts to as much as 10% to 15%.

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Acid Improves Milk "Wool"

SYNTHETIC wool-like fibers made from milk can be improved by treatment with acid, A. E. Brown, W. G. Gordon, Edith C. Gall and R. W. Jackson of the Eastern Regional Research Laboratory, U. S. Department of Agriculture, reported before the meeting. Acetylation did not increase the strength of the fibers, the chemists stated, but the treatment

did make the material more resistant to boiling, and rendered it more nearly similar to wool in its behavior in the dye vat.

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Coal Tar Treasures

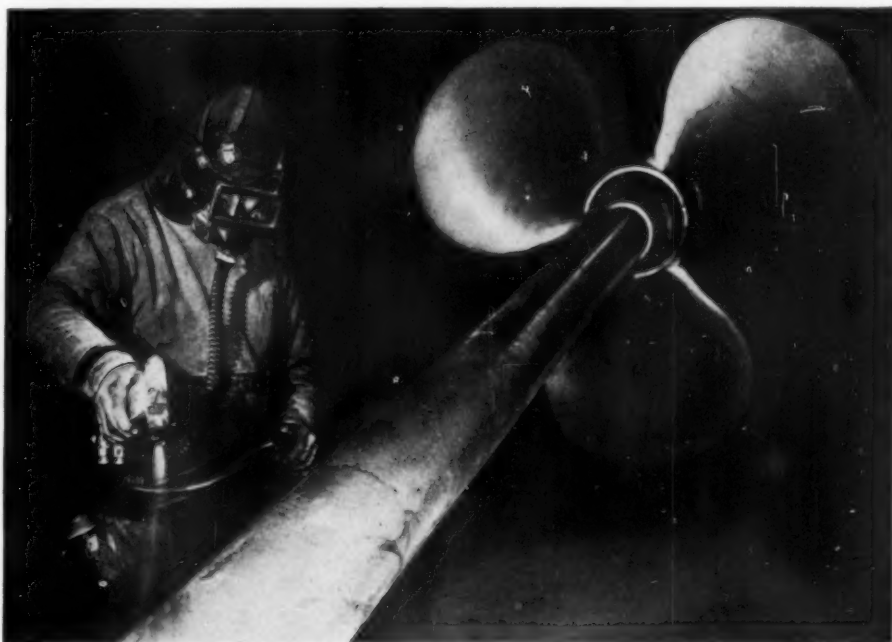
► COAL TAR, that familiar magician's hat of chemical industry, is still turning out new and valuable things, the meeting of the American Chemical Society heard from F. E. Cislack, director of research for the Reilly Tar and Chemical Corporation of Indianapolis.

Under the stimulus of war needs, a relatively neglected group of tar compounds, that have hitherto been only laboratory curiosities, have become the mass-production sources of a wide range

of substances, from synthetic rubber to a vitamin used in enriching bread. The synthetic rubber, reported the speaker, is the nearest approach to the natural article that has yet been made; it is known as vinylpyridine. The vitamin is synthetic nicotinic acid; the new process makes it much more cheaply than the former method of extracting nicotine and subjecting it to chemical treatment.

A vital contribution to the wartime production of steel is made by these coal tar bases, Mr. Cislack said, in their use in the acid baths that dissolve the scale on steel formed during the rolling process. The acid ordinarily attacks steel as well as scale; addition of coal tar bases to the acid inhibits their action on the steel while leaving their effectiveness as scale removers unimpaired.

Other useful jobs for coal tar bases enumerated by the speaker included waterproofing material for cloth, fungicides and germicides. Notable among



SPRAY-GUNNING RUBBER—Bronze propellers fitted to steel shafts on wooden vessels, such as U. S. Navy sub-chasers and minesweepers, produce an electrolytic action through the union of two dissimilar metals in salt water, with the result that the shaft is so eaten away within a few months that it cannot stand up under high-speed operation. The first successful solution to this menace was found to be Thiokol synthetic rubber flame-sprayed onto the shafts, as shown in this picture from the Schori Process Corp. of Long Island City, N. Y.

the latter is sulfapyridine, one of the most important of the sulfa group of medicines.

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More Rubber From Grain

► **MORE** synthetic rubber from a given quantity of grain, and quicker, was the promise held forth before the American Chemical Society by Dr. Donald F. Othmer of the Polytechnic Institute of Brooklyn.

The conventional method, now in use, involves fermenting the grain into ethyl alcohol, and then converting this into butadiene, one of the two basic materials for the kind of synthetic rubber now being mass-produced for war purposes.

By a different kind of fermentation, recently developed but quite well known, grain can be turned into a compound somewhat more complex in its structure than ordinary alcohol; this liquid is known as butylene glycol. It resembles glycerin in some of its properties. Butylene glycol can be converted into glycol diacetate by treatment with acetic acid—the stuff that makes vinegar sour. Glycol diacetate can then be changed into butadiene.

The contribution of Dr. Othmer and his associates has been the development of a series of new solvents that wash the glycol out of the fermentation liquors, and a simple new technique of distillation. The process has been tried out on a pilot-plant scale at Lawrenceburg, Ind.

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"Six Impossible Things"

► **CHEMISTS** attending the meeting of the American Chemical Society were invited to "believe six impossible things before breakfast," like *Alice Through the Looking Glass*, by Dr. Gordon M. Kline of the National Bureau of Standards, speaking on recent and prospective developments in the field of plastics.

"We should expect to see transparent glass-like plastics that are as crystal clear as glass but that possess an unexpected toughness and resistance to hot water," Dr. Kline stated. "This plastic will meet the requirements of curved windows for streamlined homes and transportation, of light and easily sterilized instruments and furniture for hospital use, and of tough transparent containers for foods and drugs, containers reusable in the home for canning pur-

poses, tumblers, and other general utility applications."

Among other plastic products foreseen by the speaker are flameproof, waterproof, non-spotting, featherweight fabrics; draperies that let sunshine stream into the house by day but insure privacy at night; wear-resistant, non-absorbent, smooth (but not slippery) upholstery materials. He foretold also the coming of lightweight plastics for bonding lightweight plywood—stuff like "frozen whipped cream," many times lighter than wood and resistant to water, fire and fungus. In the enormously expanded field of electric power and electronic controls, plastic insulators, framework, casings, panelings, will entirely replace rubber, mica, amber and all the old natural products.

In all this prophesying, declared Dr. Kline, he was being quite conservative: "No use trying to go the White Queen one better! . . . We have equalled her record of conjuring up six impossible things—or are they?"

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Needs For Chemists

► **A VERY SERIOUS** situation arising in the present lack of chemists and engineers needed to replace those being drawn out of industry into the armed forces, H. T. Briscoe of the War Manpower Commission soberly told the meeting. Figures of the U. S. Employment Service, analyzed and reported by the National Roster of Scientific and Specialized Personnel, indicate that for a recent six-month period, some 15,000 typical firms engaged in direct war work employed 115,000 engineers and 20,000 chemists, and that they were in need of substantial increases in the numbers of both. Urgently needed additions to the ranks of these indispensable workers, Mr. Briscoe stated, would be in the neighborhood of 12,000 engineers and from 2,500 to 3,000 chemists in the first six months of 1944. But there is no warrant for expecting that these needs will be met.

Post-war chemical industry faces serious problems connected with these shortages in trained personnel, the speaker continued. If the war should end in 1944 or 1945, the situation might not be too serious; but if it goes on for several years longer, our failure to keep a steady stream of young people passing through our colleges and technical schools is bound to place American industry under a heavy handicap.

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NUTRITION

Food For China Seen As Partly a Chemical Problem

► **FOOD** for the millions of China was posed as a problem in chemistry before the American Chemical Society meeting in Cleveland by a former American professor in a Chinese University, Dr. William H. Adolph, now of Ithaca, N. Y., at one time head of the department of biochemistry at Yenching University, Peking.

Proteins, the foods that form muscle, blood and nerves, are chronically de-

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ficient in the diets of a large part of the Chinese population, Dr. Adolph indicated. Unable because of the crowded condition of the populated areas in China to obtain animal proteins such as meat, cheese and eggs, the Chinese rely heavily on a cereal diet, which is overbalanced in the direction of carbohydrates. Chinese nutritionists realize this, and are striving to overcome the difficulty, though as a practical matter they stay within the framework of a vegetarian diet. They are also trying to get their countrymen to use more fresh vegetables, placing special emphasis on Chinese celery cabbage.

In some districts in North China, it

has been discovered, a rather well-balanced ration, practically altogether vegetable, was worked out by the peasants ages ago, and they stick to it today because, as they say, it "stays with you." The cereal mixtures used in this diet differ from locality to locality, but the net results are good for any given blend of foods.

Millions of people in North China never taste rice; they use wheat and millet as their mainstays. For these people a great benefit seems to be in sight, in a recently bred variety of millet that contains 14% or 15% of protein instead of the usual 9%.

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CHEMISTRY-MEDICINE

Penicillin for Public

Enough to treat all urgent civilian cases should be available in the near future, Agriculture expert predicts at chemistry meeting.

► ENOUGH penicillin to treat all urgent civilian cases is expected to be available in the near future, Robert D. Coghill, chief of the fermentation division of the U. S. Department of Agriculture's northern regional research laboratory, told the American Chemical Society meeting in Cleveland.

The discovery by Dr. A. J. Moyer in this laboratory of the action of corn steeping liquor on the growth of the mold, penicillium, was "possibly the greatest single factor in making the commercial production of penicillin feasible," Mr. Coghill declared.

That production reached an estimated 40,000 million units of penicillin in March of this year, contrasted with a total of 400 million units for the period of January to May, inclusive, last year.

The cost of the penicillin for treating a severe case of blood poisoning would be \$35, Mr. Coghill estimated, on the basis of using about 1,000,000 units at the present cost of \$3.25 per 100,000 units. A case of sulfa-drug-resistant gonorrhea could be treated for less than \$5, Mr. Coghill said. The first price quoted for penicillin, and acknowledged to be less than cost, was \$20 per 100,000 units. The present price will undoubtedly go much lower and penicillin, in Mr. Coghill's opinion, will be within the reach of everybody.

The chemistry of penicillin, he stated, is considered of enough importance to be a military secret. He gave the following answer, however, to the question

of whether chemists have succeeded in synthesizing penicillin, that is, in creating the mold chemical without benefit of the mold:

"We are not thinking of scrapping our fermentation plants yet."

There are now 21 of these penicillin-producing fermentation plants being erected in this country and Canada at a total cost of \$20,000,000.

In contrast to the size and cost of the plants and their equipment, when they

CHEMISTRY

Fuel From Plants

Gasoline, lubricating oil and coal can be made faster by man than by nature from many common plants, including even wayside weeds.

► GASOLINE to run the world's automobiles, coal to fuel its industries, oil to keep them all moving smoothly, can be made from potatoes, sugar-cane, sawdust, even wayside weeds, after the present reserves in the ground have been used up, Prof. E. Berl of the Carnegie Institute of Technology announced at the Cleveland meeting of the American Chemical Society.

Man can now duplicate in hours the products which slow nature took millions of years to form, through processes which he has developed, involving the use of pressure and temperature, Prof. Berl de-



UNDER THE SUN—As a preliminary operation in steel plate production, this workman is turning a slab broadside preparatory to further rolling on a sheared plate mill of the U. S. Steel Corp.

reach a 200,000,000,000 unit per month production, their output by weight will be only about nine pounds of pure penicillin per day.

Fantastic as this seems, Mr. Coghill pointed out that this amount will treat approximately 250,000 serious cases per month and for our fighting men will mean the saving of thousands of lives, to say nothing of arms and legs.

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clared. There is no need to anticipate a fuel famine so long as the sun shines and makes plants grow, he added.

The Pittsburgh researcher was interested at first only in the "pure science" aspects of the fuel problem. He wanted to find out whether oil and coal were formed in nature from the cellulosic part of plant materials or from the lignin. His investigations satisfied him that cellulose was the original material. In the meantime, however, the laboratory techniques he used were beginning to turn out substances that were pretty good synthetic reproductions of the natural

fuels. He was also able to up-grade some low-grade natural fuels, for example converting non-coking lignites and sandy bituminous coals into coking coals.

The process, which Prof. Berl calls "incoalification," involves the use of alkalis derived from limestone, dolomite or zeolites. He believes that crude petroleum was formed from carbohydrates in nature if "during the first steps of the carbohydrates conversion a larger amount of alkali produced by limestone, dolomite or zeolites, etc., was present. By a rather complicated conversion process, finally, asphalts were formed which upon cracking or hydrogenation at low temperatures were transformed into crude oil."

Production of motor fuel from starchy or fiber crops grown year by year would

not place an undue tax on American agricultural capacity, according to Dr. Berl's figures. In 1941, for example, America's 32,000,000 automobiles used 55,600,000 tons of liquid fuel. To make that same amount of fuel from sugar-cane, "4% of the cropland harvested in the United States (320,000,000 acres) and 2.1% of the land available for crops (570,000,000 acres) would be necessary."

If the world ever goes wholly on a fuel-from-plants economy, the nations with large cultivable areas in the tropics will enjoy a tremendous advantage. Starchy plants grow at terrific rates in the tropics, and it is there that sun-power could be converted into engine-power most abundantly.

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RESEARCH

Reckless Drafting

► LABORATORY heads and industrial executives attending the Cleveland meetings of the American Chemical Society have been going into anxious little huddles, between the scientific sessions, exchanging worries over what the speeded-

up under-26 draft is doing to their research staffs who have been working on war problems.

In many places, draft boards have been pulling men out of their research jobs in apparent reckless disregard of

consequences. They seem to have a fixed idea that the quota of prospective infantrymen must be met, even if it involves robbing the ground troops of overhead protection through slow-down of aviation fuel production, or leaving the wounded without adequate medical treatment through diminished penicillin production. They just don't think that far.

Official instructions have been to leave young men on the chemical job, if it can be conclusively demonstrated that that job is immediately and directly connected with war production. But these instructions seem to have been disregarded, or at any rate given an extreme interpretation, by some draft officials.

If a man is working on a less immediately war-connected problem, if he is doing fundamental research that will not bear industrial fruit until day after tomorrow, he is not given a chance to go on with his potential contribution to the greatness of post-war America; into the ranks he goes.

This can have very serious consequences, for other nations, notably Russia and Britain, are conserving their research scientists and seeing to it that they continue their training. They are our Allies today, but they will be our competitors in the business and industrial world of tomorrow, and they do not intend to throw away the best assets they have—the brains of tomorrow's scientists.

Dr. Charles L. Parsons, secretary of the American Chemical Society, put the situation into forceful words:

"Even victory will be fruitless if the scientist is sabotaged. I wish definitely to go on record that if some of the undisclosed discoveries and others that appear imminent do not come to fruition, the American people must hold those directing the combat army responsible, not the scientists of this country.

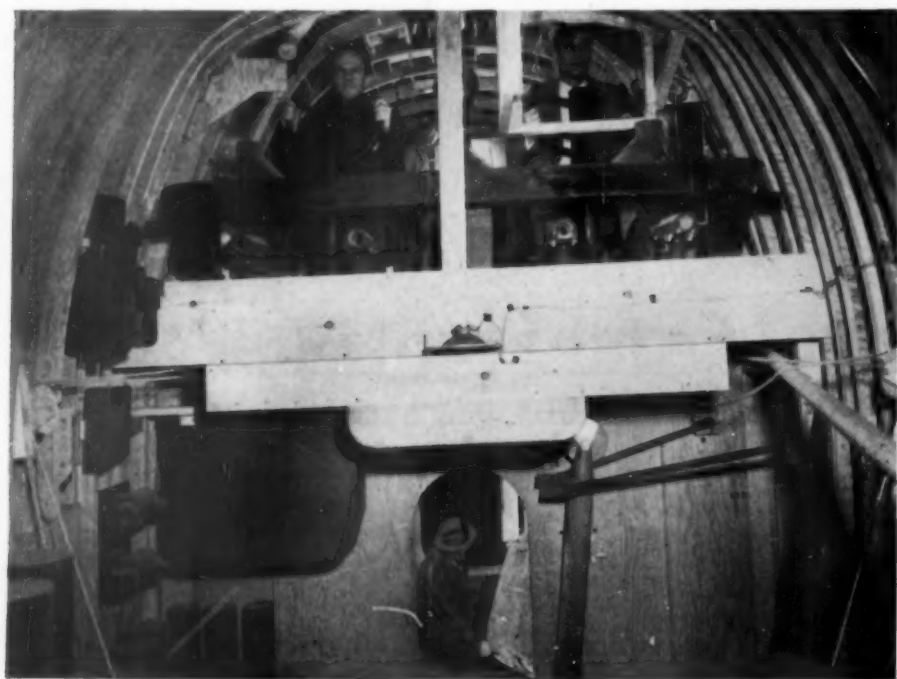
"England, Russia and Germany are protecting brains in order that brawn may function more efficiently. American brains are equal to any, and if permitted, stand ready to continue to function."

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CHEMISTRY

Three Prizes of \$1,000 Given Outstanding Chemists

► THE AMERICAN Chemical Society's \$1,000 award in pure chemistry for 1944 has been voted to Dr. Arthur C. Cope, associate professor of chemistry at Columbia University, it was announced at the Cleveland meeting. Dr.



MOCK-UP VERSION—The Martin JRM-1, production version of the 70-ton Mars, will be even larger and more efficient than the prototype now in service in the Pacific. As a cargo carrier the JRM-1 will have ample space for seven jeeps and even greater numbers of field guns or aircraft engines, for it has been designed to fly at weights up to 72½ tons. Twenty of these huge aerial freighters will be built for the Naval Air Transport Service by the Glenn L. Martin Co. of Baltimore. The two men "upstairs" in this picture are in the pilots' seats of the wooden model of the plane.

Cope, who is only 35, has already published more than 30 papers announcing results of his researches in organic chemistry, which will have ultimate application in the fields of plastics and drugs. This prize was founded particularly to encourage research in pure chemistry by the younger generation of chemists.

Two other \$1,000 prizes were awarded to chemists attending the meeting. The Eli Lilly and Company prize in biological chemistry was presented to Dr. Joseph

S. Fruton of the Rockefeller Institute for Medical Research, for studies in the difficult field of the proteins and their structural units, the amino acids.

The Borden Company prize for research in the chemistry of milk was handed to Dr. William Mansfield Clark of the Johns Hopkins University, who has done special work on the precise determination of the acid or alkaline state of milk.

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CHEMISTRY-MEDICINE

Weapon Against Cancer

Radioactive zirconium is seen as new chemical for use in combatting disease. Since it is a solid it can be applied directly to tissues under treatment.

► **CANCER** can now be exposed to the fire of a new and powerful chemical battery, as potent as radium emanation but much more maneuverable. It is radioactive zirconium in completely pure form, preparation of which was announced before the Cleveland meeting of the American Chemical Society by a wife-and-husband research team, Dr. Margaret H. Kurbatov and Prof. J. D. Kurbatov, both of Ohio State University.

Radioactive zirconium is a solid, coming in extremely finely divided form—colloidal particles, in the chemists' term. Being a solid, it can be applied directly to the tissues under treatment. This gives it considerable advantage over radium emanation, which is a gas and has to be applied enclosed in small tubes or hollow needles.

Radioactive zirconium has the same half-life as radium emanation, three and one-half days. This should make easier the development of a clinical technique for its use, since the potency and rate of disintegration of radium emanation figure importantly in the determination of treatments. Thus far, however, the new substance has not been given medical application.

Zirconium has been prepared in radioactive form before now, but hitherto all preparations have been mixtures of the radioactive with the ordinary element.

In preparing it in pure form, the Doctors Kurbatov made use of an entirely new technique, an ultra-micro-chemistry which they themselves evolved. It involves the bombardment of rare elements with the powerful cyclotron at Ohio State University, and examining the results with two instruments, the Geiger

counter and the electrometer, which register number and kind of radioactive rays or particles given off. These data can be interpreted in terms of new substances brought into being by the bombardment. Quantities smaller than a billionth of a gram can be thus detected and studied.

In the case of the radioactive zirconium, they subjected the scarce element yttrium to the cyclotron's action for several hours. The quantity of radioactive zirconium thus formed was so small that it could never be seen, even with a microscope, yet its activity, particularly its emission of gamma rays, left no doubt of its presence and its identity.

There is another radioactive zirconium, which has the much longer half-life of 63 days. Thus far, however, it has been produced only in mixture with common zirconium. It can be used when absolute purity is not required. A number of other radioactive substances have been isolated in pure form at the Kurbatovs' laboratory.

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PSYCHOLOGY

War Disabled Should Be Treated as Though Normal

► **WHEN**, at work or in a social group, you meet a man disabled by a war injury, keep an attitude of normality and treat him as though there were nothing intrinsically different about him as a result of his handicap. So advises Maj. Walter E. Barton in a report to *Public Health Nursing*, a professional journal for nurses,

Major Barton lists nine other points to remember in helping deformed or crippled war veterans regain their emotional stability and "focus attention on what is left instead of on what is lost." Although written for nurses, these pointers may be a useful guide for relatives, friends and fellow workers of the veterans. They are:

1. Be natural. A natural manner that one would bring to a normal person is all that is necessary.

2. Face the reality of the disability. Create within the patient a willingness to face the fact of his limitation.

3. Ignore the deformity. Let no horror or sorrow appear in the face or manner of the person in contact with the deformity.

4. Reassure the handicapped. Help the soldier concentrate on the determination to get well and on the determination to overcome the loss.

5. Restore his faith in his ability. The martyr's attitude may be noble but it doesn't bring much happiness to the individual.

6. Continue social living. Encourage the patient to resume social contacts after he returns to his own home.

7. Give the patient a job to do. Work is associated in our minds with health.

8. Keep a balance in life. In order to maintain mental health, some work, some play, some rest should be a part of every day.

9. Stress the importance of beauty of spirit. The handicapped person who has overcome his disability carries a great message to those who feel overburdened by life's many tribulations.

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PUBLIC HEALTH

Falls Lead As Cause Of Accidental Death

► **THE WAR** and its restriction on automobile driving have pushed falls into first place as cause of accidental deaths in the United States, the Metropolitan Life Insurance Company reports.

Nosing out motor vehicles, falls in 1943 killed more than 25,000, which was about 2,000 in excess of the number killed by motor vehicles.

Chief victims of fatal falls are old people. Whether because they fall more often, or because when they do fall the results are more serious, is not known, but more than two-thirds of the deaths from falls happen among persons aged 65 and older.

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MATHEMATICS

Chinese Mathematician To Lecture In America

► HWA LO-KENG, a self-taught Chinese mathematician, is coming to the United States to lecture at the invitation of Dr. Albert Einstein, physicist and mathematician, now professor in the Institute for Advanced Study at Princeton, N. J., according to reports to the Chinese News Service in New York.

Prof. Einstein is starting a series of lectures on unsolved problems in mathematics by authorities from various parts of the world. Both he and Mr. Hwa will serve as directors as well as lecturers of the program. There will be a total of four such directors.

A native of Kingtai in Kiangsu Province, Mr. Hwa is the author of eight dissertations in his field. His two published theses, on much discussed but unsettled mathematical problems, have aroused great interest among the mathematicians of the world.

The young Chinese, lame as a result of infantile paralysis, used to be a salesman at a small cigarette store in Kingtai. Between sales he found time to study mathematics for he was too poor to go to a school of higher education or take lessons from a private tutor. He wrote several articles as a result of his study and contributed them to mathematical periodicals, through which he became known abroad.

Mr. Hwa never went farther in school than junior high. Like the famous inventor, Thomas A. Edison, he was considered dull-witted in primary school, where he failed in every arithmetic test he was given.

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PHYSIOLOGY

Nazis Increase Ceiling By Operating on Pilots

► REPORTS are current in scientific circles that the Nazis are enabling some of their fighter pilots to fly to greater altitudes by an operation to remove part of the thyroid gland, according to a statement from New York University.

The same effect may be achieved by small doses of the chemicals, thiourea and thiouracil, experiments at the University's Washington Square College of Arts and Science suggest. These experiments were reported by Dr. Harry A. Charipper, Dr. Albert S. Gordon and Dr. E. D. Goldsmith. (See *SNL*, Feb. 12)

In these experiments the scientists found that rats given thiouracil for 12

days were able to survive at atmospheric pressures comparable to those at altitudes of 32,000 feet without the aid of oxygen, although untreated animals died at such pressures.

The reason is that thiouracil and thiourea interfere with production of normal thyroid hormone by the gland. This tends to slow body processes including oxygen consumption. The chemicals have been found effective in treating persons with overactive thyroid glands, slowing their metabolic rate to normal.

The assumption is that in the pilots with normal thyroid glands the chemical might similarly slow metabolic activity and oxygen consumption to a below-normal level at which they could get along with the decreased amount of oxygen available in the air of high altitudes.

In the experiments, when the medicine was stopped the rats' thyroid activity rapidly returned to normal. The reports about the Nazi fighter pilots indicate that after the war they will have to get doses of thyroid extract for the rest of their lives to make up for the loss of some of the gland tissue.

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PUBLIC HEALTH

Welding Cannot Be Blamed For Workers' Sterility

► BELIEF that welding may cause sterility in workers through exposure to infra-red, visible or ultraviolet energy is unsupported by evidence, Arthur C. Stern, of the New York State Labor Department's Division of Industrial Hygiene, reported before the occupational disease session of the Greater New York Safety Council meeting.

The alleged effect of welding in producing sterility, particularly among women workers, stems from confusion of ultraviolet used in welding with X-rays and gamma rays which do bring about sterility, Mr. Stern stated.

"There is no exposure to either of these types of rays in welding. Hence the alleged hazard is non-existent."

There appears to be no relationship between welding and kerato-conjunctivitis, or ship-yard eye. The disease is of virus origin, he pointed out, and probably is spread from infected eyes by infected hands, instruments, and goggles.

Nor can welding be blamed for epidemics of pneumonia, Mr. Stern maintains. Fumes released in welding have no adverse effects upon workers and pneumonia must be ascribed to other causes.

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IN SCIENCE

MEDICINE

Penicillin May Be Remedy For Infectious Jaundice

► HOPE that penicillin may be an effective remedy for Weil's disease, or infectious jaundice, is suggested by its success in guinea pig experiments conducted at the Mayo Clinic by Dr. F. R. Heilman and Dr. W. E. Herrell with the technical assistance of Miss Constance Carter and Miss Nellie Greenburg.

Cases of Weil's disease have occurred in nearly every civilized country, with deaths running from five to as high as 55 out of every 100.

"The conditions imposed by war may favor outbreaks of this disease," the Mayo Clinic scientists point out.

Epidemics have been associated with armies as far back as Napoleon's campaign in Egypt. The fact that the leptospiras which cause the disease are spirochetes suggested trying penicillin as a remedy, because penicillin has been reported effective in another spirochete-caused disease, syphilis.

In the final experiments at the Mayo Clinic, 64 guinea pigs were infected with heavy doses of leptospira. None of the 32 animals treated with penicillin died of the disease, while 29 of the 32 untreated animals died, a mortality of 91%. This leads the scientists to conclude it is "reasonable to suspect that penicillin will be useful in the treatment of Weil's disease and other leptospiral infections in man."

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TEXTILES

Army Ponchos of Nylon To Replace Cotton Ones

► NEW lightweight Army ponchos of nylon will be issued some time this month to troops in tropical combat areas to replace those of cotton. Coated with the same synthetic resin used on the old-type ones to make them waterproof, they weigh less than two pounds.

The multiple-purpose ponchos are provided with grommets and eyelets which facilitate their use as a tent when two or more are hooked together, a fox-hole cover, a ground sheet, protection from ground moisture or a moisture-imperious bedroll.

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NEW FIELDS

METALLURGY

Life of Cutting Tools Lengthened Greatly

► THE LIFE of cutting tools used in machine and other industries may be lengthened from two to 50 times by a process wholly new in metallurgy, declared Axel Lundbye of the Crowell-Collier Publishing Company, Springfield, Ohio, at the Birmingham, Ala., meeting of the American Society of Mechanical Engineers. The process consists of chromium plating and an after-treatment of soaking in hot oil at 350 degrees Fahrenheit for an hour.

In the Lundbye process, which the speaker originated, chromium is plated on steel and given the oil after-treatment to release hydrogen. The chromium then becomes an integral part of the steel and does not peel or scale from the base metal when pressure is applied, he claimed. Peeling and scaling of the chromium in other methods prevented wider use of effective plating.

The company with which Mr. Lundbye is connected has offered to make the process available without royalties to war industries for the duration. Several hundred manufacturers have taken advantage of the offer.

The process is "adapted to use in tools and machine parts which are subject to wear, corrosion, bending, shock and heavy load.

"The process results in an increase in the wearing quality of machine parts, less friction, and easier and smoother operation," the speaker stated.

Science News Letter, April 15, 1944

CHEMISTRY

Plastic Sheeting Used To Teach Blind Flying

► DAY is turned into night in an airplane cockpit by the use of red and green plastic sheeting in order to train student pilots to fly blind.

The cockpit windows of the airplane are covered with green plastic. Through the plastic, which transmits practically nothing but blue-green light, the instructor can clearly see the ground and sky, although it has a greenish look. He can also see everything inside the plane.

The student pilot, however, wears

goggles with red plastic lenses, which transmit light in the red portion of the spectrum, but filter out light from the blue end. This makes it impossible for him to see the landscape, which appears blue-green through the plastic windows. The student can thus see the instruments, his instructor and other things inside the plane, but cannot look out beyond the windows.

Even on a brilliant day the student pilot cannot see the horizon, landmarks or clouds through the combination of red and green plastic equipment for blind flying. He must manipulate airplane controls in accordance with instruments, radio beam and instructions. But his instructor, who can see out freely, can spot other aircraft nearby and check the plane's course against landmarks, and stands ready to take over the controls instantly should there be any danger of mishandling.

Squares of the red and green plastic sheeting used for this purpose are contained in a kit prepared by Science Service. With these you can build a miniature cockpit and yourself see how light is blocked out when the two are superimposed. The Plastic Pilot Aids Unit of THINGS of science, which contains other specimens of plastic sheeting as well, can be secured by sending 50c to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and asking for unit No. 41.

Science News Letter, April 15, 1944

METALLURGY

Cold Treatment of Metals At Sub-Zero Temperatures

► THE STRUCTURE of metals subjected to cold treatments at temperatures from 80 to 130 degrees below zero Fahrenheit was described by G. B. Berlien of the Lindberg Steel Treating Company, Chicago, at the meeting of the American Society of Mechanical Engineers in Birmingham, Ala. He presented the results of recent investigations made by him.

"There are several physical changes noted in metals that had been quenched to very low temperatures," he said. "First, there was an increase in magnetic qualities. Also, a volume increase that was permanent at room temperature after such treatment was an important factor. Along with the above two changes, there occurred an increase in hardness sufficient to detect with our conventional hardness indicators, such as the Rockwell machine. The temperature required for these changes ranged from 80 degrees Fahrenheit below zero to 130 degrees below zero. The temperature requirements are governed by the alloy content of the material in much the same way as the hardening temperatures are governed by the same factor."

Science News Letter, April 15, 1944

TECHNOLOGY

Dishes to Match Mood Predicted for Future

► THE HOUSEWIFE of tomorrow will own not two but half-a-dozen sets of dishes—a set for each mood, J. Gordon Lippincott, New York ceramist, told the American Ceramic Society's war conference in Pittsburgh.

Dishes will be cheap and beautiful, and they will be sold by high-pressure like automobiles and refrigerators, he elaborated.

Before this can take place, Mr. Lippincott cautioned, U. S. glass and ceramic manufacturers will have to go a step beyond traditional handicraft techniques to keep pace with post-war industry.

If there can be developed chipless, flexible porcelains, mass production of attractive low-cost household ware and introduction of steel dies to mold ceramics and glass, these industries will be immune to competition, Mr. Lippincott said.

The basic methods of ceramic manufacture today are the same as they have been down through the ages, he contended.

Plastics and aluminum, encroaching on fields once relegated to ceramics and glass, should provide stimulus to further research on these materials, Mr. Lippincott said.

Synthetic resins are vying with ceramics and glass as vitreous coating to surface steel. Plastics have almost pushed ceramics out of the picture in the manufacture of switching devices, electric light sockets, and translucent substances for the diffusion of light.

Science News Letter, April 15, 1944

INVENTION

Flexible Wooden Soles For Shoes Patented

► A NEW TYPE of a flexible wooden sole for a shoe has received a patent, 2,345,831, issued to Harold L. Pierson of Rochester, N. Y. who has assigned it to E. P. Reed & Co. of the same city. It consists of a wood tread surface made up of small wood units, each a square except those along the edge of the sole, and having independent movement. They are held to a thin leather split or some other available material with a suitable cellulose cement, with the grain of the wood at right angles with the grain of the split. The wood sole is treated with a waterproofing material to prevent it from swelling in use.

Science News Letter, April 15, 1944

CARTOGRAPHY

Maps for Fighters

Charts, photographs and atlases are marshalled for use by experts in compiling military maps which are absolute essentials of any military operation.

By MARTHA G. MORROW

► **GENERALS PLANNING** a campaign or directing a battle live in a litter of maps, if we may believe the pictures we see. Maps are spread on the table at headquarters, more maps lie folded or rolled in cases or on chairs, big maps all speckled with pins hang on the wall.

Regimental commanders on the march consult maps, as anxiously as any tourist motoring in strange territory. There are no friendly signposts to point the way—and the penalty for taking the wrong turn is likely to be severe. Company commanders moving into line have maps of their own and adjoining sectors of the front. Artillerymen must have maps of split-hair accuracy, for a line misplaced by a tenth of a millimeter on the map may throw their fire off the target by a hundred yards, or even cause them to shell their own front-line infantry.

Maps thus appear as absolute neces-

sities in any kind of military operation, from the greatest to the least. Soldiers must have, first of all, good shoes. Then they must have weapons and ammunition. Then food. Probably good maps would come next—if indeed they should not come even before food.

Making up-to-the-minute maps, accurate in every possible detail, is the job of the Army Map Service, which serves both the Army and Navy. On the outskirts of Washington, D. C., there is a camouflaged, windowless building. This is the military map center of the U.S.A., the scene of great activity, continuous research, and painstaking checking and rechecking.

All available data concerning the region to be mapped are sought. An old guidebook or a new atlas, a map from a refugee's suitcase or recent photographs taken from a bomber, all may be utilized in mapping the region. The country has been scoured for bits of information that might be useful.

The completed maps are printed on paper which will stand up under hard wear and rough treatment. Though the map should fall in the mud or have grease spilled on it, it can be washed off and used again.

Airplane pilots, flying by night, are thankful for the fluorescent maps. These maps, printed on a newly-developed paper, literally spring to life when the pilot's tiny ultraviolet light, invisible to the enemy plane spotter below, is turned on.

Unfortunately for the map-maker, the spheroidal shape of the earth cannot be presented on a flat surface without distortion. The well-known geographic coordinates, our longitude and latitude, are considered too cumbersome for military use, and a system of rectangular coordinates called a military grid has been devised. Since Pearl Harbor, this system has been adopted to fit all areas outside this country where the British grid was not already in use.

The scale of the map is determined by its eventual purpose. Maps used in planning a campaign, for instance, are less detailed than target maps or those for the ground forces. In a scale of 1 to 63,360, such as might be used in a tactical map, one inch on the map represents a mile on the earth's surface.

Value of a Map

The value of a map depends on the reliability of the sources from which it is compiled. Wherever possible, it is customary to use cartographic material published by the government of the country shown.

In determining the value of a map as a source, a check is made against existing maps which are known to be reliable. The date the map was made, when the latest corrections were added, the reliability of the publisher, and clarity of detail are all considered. When a compiled map is used, it is first checked against the sources listed.

Corrections are constantly being made on maps kept on file, so that they will always be up to date when needed. The corrections may be noted on transparent sheets placed over the master map, or made on photographs of the map.

A detailed Japanese map may bear the names of hundreds of villages, never before translated into English, all print-



CONTRAST—Fluorescent maps spring to life under ultraviolet rays. Notice how dark the man's face and hands are in comparison with the many details visible on the fluorescent map shown in this picture.

ed in foreign characters. These must be expressed in our alphabet so that when pronounced they will sound like the original Japanese names.

Two languages sometimes appear on maps of foreign countries. In this case the native word for farm, inn or bridge might be used on the map proper and be translated in the glossary at the bottom. Such a map would assist an officer or soldier to receive local help in finding an objective.

Large-scale topographic maps generally make the best maps upon which to base additions and corrections. Others may give railroads, roads, and other important information which should be incorporated into the new map. Photographs taken by pilots flying over enemy territory may supplement the information already on hand.

The difference between single and double track railroads, main and secondary roads, important or unusual buildings, camouflaged installations, canals and airports can be recognized by an expert from photographs. Each photograph is studied intently for additions, deletions or revisions to be made on the map.

Should Overlap

To be of the greatest service, consecutive photographs should overlap about 60%. The side lap between adjacent flights usually ranges between 15 and 30%. In war zones, however, the photographing plane is frequently driven from its predetermined course by enemy fire.

Photographs taken from an airplane are ordinarily vertical, but frequently the plane tilts just as the shot is taken. The angle at which the photograph was made is calculated and the picture photographed with the camera tilted the same number of degrees in the opposite direction. The resulting scene looks approximately as it would have if taken from a vertical position.

Outstanding points such as church towers or bridges are located and used as a guide in piecing together the picture-puzzle. The prints are cut to match as nearly as possible and a mosaic made. This is photographed and becomes the basis upon which additions and corrections on the map are made.

The maps selected as a base are photographed, and a blue line print is made from the mosaics. This is mounted on a board so it will not shrink or show other distortion, and given to a compiler to ink in the desired features. Non-pertinent data are left in blue. It need not be



FURTHER PROCESSES—Regions to be tinted a specific shade are inked solid in black on the color separation map. Additions and changes noted on the transparent gluetone, which has been rolled back, are shown being transferred to the map.

erased, as in the photographic process used the blue will not show up.

The compilation is drafted in colored inks which are the same as those to appear on the finished colored maps. Blue is the one exception; since blue will not photograph, all blue lines appear in green.

These maps are checked in great detail with the original sources and when corrections must be made, are sent back to the compiler for additions or changes. To make corrections legible and to avoid marking up the drafted copy, a transparent, acetate overlay is placed over the drawing before the check is started. Corrections are then made on the overlay.

Maps usually appear in four or five colors. Rivers, lakes and oceans are shown in blue on multicolored maps. Contours and other information related to the elevation of a mountain or valley are shown in brown. Man-made features such as railroads, bridges, buildings, and names of cities and towns appear in black. Roads or highways are printed in red. Woods, forests, orchards and vineyards are appropriately shown in green.

When corrections have been made and checked, the map is photographed. The new blue line board shows in one color all the lines and symbols of the multicolored map. Now each color that is to

appear on the finished map must be drafted separately in black.

Several shades of blue, green or brown are sometimes used to give a more vivid picture of the region at a glance. The tints become progressively darker with an increase in height, so that a mountain top is darker brown than the valley and the seashore. Regions to be tinted a specific shade are inked solid in black.

Plate Made for Each Color

A plate is made for each color to appear on the finished map. In printing, the various colors are made to fall in place exactly. A map would be spoiled, for instance, if the contours governing the path of a river, shown in brown, were shifted slightly to one side of the river in blue. Some of the presses at the Army Map Service are equipped to apply two colors, thus diminishing the chance of error.

About 25 copies of a map are run off and sent for a final check. If important errors are discovered the presses may be stopped and corrections made on the plates themselves. Thus the maps to serve our fighting forces are as accurate as the knowledge at hand and a constant search for new information can make them.

Do You Know?

Cork normally is used in 50 different places in an automobile.

Domestic *airplanes* carried over 470,000 passengers in 1931, and over 4,000,000 in 1941.

Mice have been taught to distinguish between two musical notes, one of which is associated with the appearance of food.

On seacoasts where fresh water is scarce, *fish* is a better food than lower forms of marine life because the salt content is less.

Giant *cement kilns*, 500 feet long and weighing 1,200 tons, are each turning out up to 200,000 tons annually to meet war needs.

Thirty-five new improved varieties of strains of *crop plants* were released by the U. S. Department of Agriculture during the past year.

Not all *plastics* are new; cellulose nitrate was discovered in 1830 and celluloid was produced in 1868; casein plastics were made before 1900.

A baby *kanaroo* at birth is about one three-thousandths of its mother's weight; the human baby is approximately one-twentieth the weight of the mother.

An ounce of *field soil* contains some 50 billion bacterial cells, a large but unknown number of fungi, and something like 5,000,000 protozoa, in addition to other organisms.

Some 12,000 *mulberry* slips were planted in Brazil in 1930 as a basis for silk culture, and silk weaving was begun in 1938; in 1942 over 277,000 mulberry trees were planted.

Fifty United States doctors, scientists, engineers and other specialists are working with some 2,500 Brazilians in the Amazon and Rio Doce campaigns against *malaria* and other diseases.

Lumberjills are replacing lumberjacks in England; strong, physically fit women from 17 to 40 years of age, after one month's training in forestry, are working in the timber and the sawmills.

CHEMISTRY

Three Kinds of Sugar

New table treat, apple syrup, contains sucrose, dextrose and levulose. Has a clear amber color but does not taste particularly like apples.

► "PASS the apple syrup, please" will soon become a familiar request at American breakfast tables.

"Just concentrated sweetness," was the description given the new product by three U. S. Department of Agriculture research men before the meeting of the American Chemical Society in Cleveland. The three men are Dr. R. E. Buck, Dr. J. J. Willaman and Dr. H. H. Mottern, all of the department's Eastern Regional Research Laboratory at Philadelphia.

The strong appeal which apple syrup is expected to have for the national sweet tooth is due largely to the fact that it contains three different kinds of sugar: sucrose, dextrose and levulose. Of the three, levulose is by far the sweetest, and it is present in the syrup in high concentration. The product has a clear amber color, but does not taste particularly like apples.

Apple syrup offers an opportunity for the utilization of the enormous quantities of apples that now are never marketed, and simply rot on the ground under the trees. It is estimated that at least 20 million bushels of apples are thus lost every year. This is enough to make 100 million pounds of syrup, if all could be used.

Last year preparations were made for producing 20 million pounds of apple syrup, but a short crop of both apples and manpower cut the actual production down to three million pounds. The 1944 apple crop promises well, but labor is still short, so it may not be until after

the war that we shall all be able to get our quota of apple syrup.

The syrup is prepared in much the same manner as the commercial product which has been given the advertising name "apple honey," but (as the advertisers put it) "something new has been added." Essentially, commercial apple syrup is made by clarifying the apple juice with lime to remove among other things the jellifying substance, pectin, and then evaporating it down to the desired consistency.

Commercial apple syrup is excellent for the uses to which it is put, but many persons find that it has a slight bitter after-taste. One additional chemical step has been put into the preparation process, which removes this tang and leaves the product with an unalloyed sweet flavor.

Glucose has been prepared almost exclusively from corn so long that it is often called "corn sugar." The peculiar situation that has obtained for the past year or two, of having a surplus of wheat but none of corn, has brought about investigations of commercial methods for producing glucose from wheat starch. Several reports on various phases of this were presented at the meeting, by J. M. Brown of the Revere Sugar Refinery, Boston; Mason Hayek of Joseph E. Seagram and Sons, Inc., and R. L. Shriner of Indiana University; and R. J. Dimler and C. E. Rist of the Northern Regional Research Laboratory at Peoria, Ill.

Science News Letter, April 15, 1944

BIOCHEMISTRY

Elixir of Youth in Protein

► SOMETHING that the old-time alchemists would certainly have called the elixir of youth, had they known about it, exists in everyday protein foods—meat, cheese, eggs and the like. At any rate, its absence from the diet brings about baldness, defective teeth, anemia, cataract, permanently bloodshot eyes, degeneration of the sex organs in the male, reproductive failure in the female.

The substance that wards off these

obvious signs of senility is called tryptophane; it is one of the dozen or so essential building-blocks of proteins known as amino acids. The ill effects of diets deficient in this and other specific amino acids were described by Dr. L. Emmett Holt, Jr., of the Johns Hopkins University, speaking before the meeting of the American Chemical Society in Cleveland.

Lack of other amino acids produces other kinds of degeneracy, Dr. Holt con-

tinued. Reproductive deficiency goes with diets short in arginine, nervous disorders with lack of valine, nephritis and hardening of the liver with absence of methionine.

Studies of this kind are going to have great practical significance during the next few years, as war-bred famine presents itself as a problem to be dealt with by the victor nations that have at least some food to spare. Proteins are always the foods most difficult to supply, and the consequences of their lack always the most serious and difficult to deal with.

It is probable that nutritional research will be as much concerned with amino acids during the coming decade as it has been with vitamins in the recent past.

Vegetable proteins are easier to produce in a hurry and in quantity than are

proteins of animal origin, but they may not have the good, high-level balance of all needed amino acids as the more expensive meat, eggs and dairy products. However, such protein sources as soybeans, peanuts and other legumes are capable of being enriched by the addition of specific amino acids such as cystine and methionine, together with heat treatment, Dr. D. Breese Jones of the U. S. Department of Agriculture told the meeting.

Heating improves the digestibility of the proteins of most legume seeds, Dr. Jones continued. Some of them, if left to themselves in the raw state, undergo a kind of partial self-digestion, which leaves them less amenable to human assimilation, even though their proportions of valuable amino acids remains high.

Science News Letter, April 15, 1944

MEDICINE

Sulfamerazine for Shock

Bacteria-destroying drug may be solution to problem of one type of shock in battle casualties, animal experiments indicate.

► **BACTERIA - DESTROYING** sulfa drugs may be the solution to the problem of one type of shock in battle casualties. The joint conclusion, reached by Dr. M. Prinzmetal of Los Angeles and Dr. S. C. Freed and H. E. Kruger of San Francisco appears in a report to *War Medicine*.

Eliminating two of the three major theories of shock causes—that nerves and local loss of body fluid are involved—the experimenters demonstrated that the non-acute or chronic type of shock resulted from blood poisoning by bacteria.

It was found that out of a dozen dogs with crushed muscles—a common injury of the battlefield—all went into shock and nine died within three days.

Plaster casts were put on injured limbs to prevent the local accumulation of fluid, blamed by many as the cause for shock. Nevertheless, 11 out of 16 dogs died of shock, and the scientists are forced to abandon the theory that this factor is an active cause of shock.

Proof that shock stems from the activity of bacteria was demonstrated when no shock resulted in cases where the muscle had been removed within 17 hours after injury had been incurred.

Microscopic examination of crushed muscle revealed the presence of many types of bacteria. It is the opinion

of the experimenters that some of the organisms may be the normal inhabitants of tissues, which are of little importance under ordinary circumstances, but grow profusely in damaged muscle.

"Amazing," the scientists state, is the observation that no deaths or symptoms of shock resulted when dogs with crushed muscles were given doses of the bacteria-killing drug, sulfamerazine, locally, intravenously, or by mouth. "If bacteria are not present the toxic factor is not formed and shock does not result," the California experimenters conclude.

Science News Letter, April 15, 1944

PUBLIC HEALTH

Hay Fever Sufferers Should Start Treatments

► **THE SNEEZING** and sniffing of spring cold victims should remind hay fever sufferers that their season of nasal misery is not far off and that it is time to see the doctor about preventive treatments.

The hay feverite's suffering is due to his supersensitiveness to the pollens of certain plants or trees. There are all-year-round hay feverites, too, but their trouble is generally due to some other substance such as feathers, horse dander, house dust or the like.

Pollen victims are usually treated by a process of desensitization. First, the physician makes careful tests to determine just which pollen or pollens cause the trouble. Then the patient is given a tiny dose of the offending substance and at regular intervals thereafter increasingly large doses until he is able to tolerate the large amounts of pollen blown on spring and summer breezes. Details of the treatment, of course, must be planned by the physician who will also give advice on general health measures and will prescribe drops for nose and eyes if necessary.

Densitization treatment can be given during the hay fever season, but is said to be more comfortable and about 20% more efficient if given before the hay fever season starts. A patient whose symptoms usually begin about May 20 is generally advised to start treatment March 1, and others are advised to start correspondingly two months before their particular season. The hay fever season, of course, is the time when the patient's particular offending pollen is in the air.

Hay fever treatment is important not only for relieving the misery of this ailment but for preventing the asthma that develops in more than half the cases. Careful specific treatment over a period of one to four years will, according to one authority, give from one-third to one-half the victims permanent tolerance to the offending pollens—in other words, a cure. For most patients, even if cure is not possible, symptoms can be controlled so that the patients can live in fair comfort and attend to their business or household duties.

Science News Letter, April 15, 1944

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CHEMISTRY

Stock Feed From Sawdust

► THOSE THICK, juicy steaks you're going to get again some day may be fattened, not on the traditional diet of corn, but on sawdust.

Not that they will chew the dry stuff directly out of the manger; they will get quantities of highly nutritious dried yeast. Yeast requires sugar to grow on; sugar can be made from wood waste, Erwin M. Schaefer, anti-Nazi German industrialist now living in this country, told the meeting of the Tenth Annual Chemurgic Conference in St. Louis. Mr. Schaefer is the one responsible for the process of making alcohol from sawdust also. (See SNL, April 1)

The technique is not new and untried; it was conducted on a large scale at Mr. Schaefer's big plant at Tornesch, near Hamburg, before Nazi overlords cast covetous eyes on it and "acquired" it. Now he is preparing to supervise the erection of a large government-owned plant in the great timber region of the Pacific Northwest where the process will be put into operation primarily to produce alcohol for wartime purposes.

To convert the cellulose in wood into sugar by the Tornesch process, tall steel towers are packed with sawdust, shavings or other wood waste. Dilute sulfuric acid is trickled down from the top, while high temperature and pressure are maintained in the towers. The liquid that flows out

at the bottom is a thin syrup—6% sugar in water. This can be fed directly to yeast cultures.

Certain mineral salts must of course be added. Most important is a source of nitrogen, for protein-building purposes; this is usually ammonium sulfate, but may be synthetic urea or some other compound.

On this sugar-plus-water-plus-mineral diet the yeast cells multiply at an enormous rate. Their frothy masses are first spun in centrifuges, then squeezed in presses, to get the water out. After drying, the yeast, very rich in protein, is ready for feeding to livestock. The protein content may run as high as 50% on a dry-weight basis, and competes successfully on a cost basis with such already-established high-protein feeds as soybean meal. It has the additional advantage, Mr. Schaefer pointed out, of total independence of the weather in its production.

Science News Letter, April 15, 1944

Alcohol From Potatoes

► SWEET POTATOES, specially bred to increase their starch content, were offered as a highly promising source of industrial alcohol for war purposes by Dr. Paul Kolachov, technical counselor of Joseph E. Seagram and Sons, Inc.

Since sweet potatoes do not keep well in storage, they were first dehydrated, at a cost of from \$5 to \$8 a ton.

In this form they were put through the starch-inversion and fermentation processes. Yields were found to be in the neighborhood of five gallons per bushel of potatoes. This compares favorably with a similar yield from corn, and is better than that from small grains. Yields on a per-acre basis also show up favorably for the sweet potatoes.

Science News Letter, April 15, 1944

CHEMISTRY

Mexicans Are Interested In Cattle Feed From Wood

► REPORTS of the possibility of producing a high-protein stock feed from wood waste, by a slight modification of a process for using the same kind of waste in the production of alcohol for war industries in the United States, have aroused great interest on the part of Mexican cattlemen.

Dr. J. Alfred Hall, principal biochemist of the U. S. Forest Service, discussed the process at the meeting in Mexico City of Mexico's Second National Conference of Chemists.

Science News Letter, April 15, 1944

INVENTION

Safer Aerial Delivery Of Fragile Articles

► AIRPLANE delivery of more or less fragile articles, dropped from the aircraft by parachutes, will be made safer by a new aerial delivery container, on which patent 2,345,609 has been issued to William L. Lindsey and Harry Wilson, Fort Benning, Ga. It is relatively light in weight and rigid and strong when packed and ready to be dropped. It may be opened quickly and the articles removed in a minimum of time after landing. Releasing a single quick-opening fastener allows the entire container to assume a wide open position.

When packed the container is an elongated package with an octagonal cross section. The eight sides are plywood panels with bevelled edges, held together with webbing covered by separate sheet metal strips. On the inside of each plywood panel is a reinforcing bar of heavier wood. The octagonal covers are hinged to the central plywood strip and interlock when closed. A pair of straps with a single quick-opening fastener holds the covers in place.

Science News Letter, April 15, 1944

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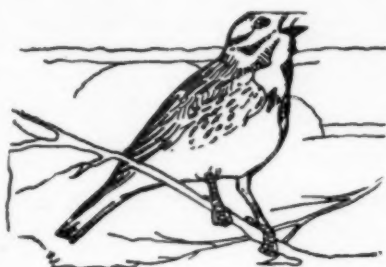
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No Trespassing!

► SMALL birds singing lustily in the springtime are not caroling hymns of praise, as a former generation of rather sentimental poets once declared. Neither are they sweetly wooing their mates, as other bards liked to imagine. At the outset, at least, their mates-to-be simply aren't there. In the spring migrations of most species, males come first, and females follow in a later wave.

In the meantime, the males have staked out their respective claims on hunting areas, that will later yield caterpillars, or insects, or whatever it is that the hungry brood will need. They proclaim title by singing as loudly as they can, and if a claim-jumper appears, assail him with fierce little wing-buffetings and pecks. Thus small birds' singing, though more melodious, serves pretty much the same purpose as the crowing of roosters or the gobbling of tom-turkeys.

Science News Letter, April 15, 1944

There may be three generations of gnats during a summer, with each generation having three or four broods.

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Books Off the Press

ALTERNATING CURRENT BRIDGE METHODS for the Measurement of Inductance, Capacitance, and Effective Resistance at Low and Telephonic Frequencies—B. Hague—*Pitman*, 616 p., illus., \$8.50, 5th ed. A theoretical and practical handbook for the use of the advanced student.

BRITAIN'S SEA POWER—*British Information Services*, 35 p., illus., paper, free.

CLOUDS & WEATHER PHENOMENA—C. J. P. Cave—*Cambridge Univ.*, 46 p., illus., \$1.75.

DUTCH EMIGRATION TO NORTH AMERICA 1624-1860—Bertus Harry Wabeke—*Netherlands Inf. Bureau*, paper, 75c.

A DYNAMIC ERA OF COURT PSYCHIATRY 1914-1944—Agnes A. Sharp, ed.—*Psychiatric Inst. of Municipal Court of Chicago*, 149 p., illus., not for sale. Copies to qualified persons on request while supply lasts.

THE GOLDEN ALMANAC—Dorothy A. Bennett—*Simon and Schuster*, 94 p., illus., \$1. A book for young children—fun and fact, games, stories and poems with a little incidental science.

GUIDING THE NORMAL CHILD—Agatha H. Bowley—*Phil. Library*, 174 p., \$3. A non-technical book of British origin intended for parents as well as teachers.

HEALTH FOR YOU—Katharine Bruderlin Crisp—*Lippincott*, 576 p., illus., \$1.80. A functional high school health text designed for basic use.

INTRODUCTORY ASTRONOMY: A Guide for Night Watchers—J. B. Sidgwick—*Phil. Lib.*, 137 p., illus., \$2.50.

MEDICAL CARE OF THE DISCHARGED HOSPITAL PATIENT—Frode Jensen, H. G. Weiskotten and Margaret A. Thomas—*Commonwealth Fund*, 94 p., \$1. This is the story of a successful experiment in extending the range of a hospital's service; it is of interest primarily to hospital administrators, physicians, health officers, welfare leaders and others concerned with community health.

MIRACLES AHEAD!—Norman V. Carlisle and Frank B. Latham—*Macmillan*, 288 p., \$2.75.

OCEANOGRAPHIC OBSERVATIONS ON THE "E. W. SCRIPPS" CRUISES OF 1940: Cruises X-XVI—H. U. Sverdrup and staff of Scripps Inst. of Oceanography—*Univ. of Calif. Press*, 187 p., \$1, paper.

THE OUTLOOK FOR SYNTHETIC RUBBER—Melvin A. Brenner—*Nat. Planning Assn.*, 32 p., paper, 25c. Planning Pamphlets No. 32.

PACIFIC OCEAN HANDBOOK—Eliot G. Mears—*James Ladd Delkin*, 192 p., illus., maps, paper, \$1. This handbook contains facts about maps, water, coastlines, volcanoes and earthquakes, tides and tidal waves, winds, storms, temperature, rain, navigation and other details of a great fighting area.

PASSENGER TRANSPORT IN THE UNITED STATES - 1920-1950—Lewis C. Sorrell and Harry A. Wheeler—*Railway Business Assn.*, 72 p., paper, 50c.

RIDING ON AIR—Merrill Hamburg and Frederic Beddow—*Pitman*, 130 p., illus., \$2. This book tells how to design, build

and fly model airplanes and gives laboratory exercises that really get across some of the science of aeronautics.

STONE MONUMENTS OF SOUTHERN MEXICO—Matthew W. Stirling—*Gov't. Printing Off.*, 84 p., illus., paper, 35c. Smithsonian Inst. Bureau of American Ethnology Bulletin No. 138.

THE TECHNIQUE OF MOTION PICTURE PRODUCTION—Society of Motion Picture Engineers—*Interscience*, 150 p., illus., \$3.50. A symposium of papers presented before the Society of Motion Picture Engineers.

THE WOUNDED GET BACK—Albert Q. Maisel—*Harcourt, Brace*, 230 p., \$2.50.

VOLCANOLOGY

Eruption of Vesuvius Has Taken 26 Lives

See Front Cover

► CONTRIBUTING its bit to the destruction of lives and property in Italy, Mt. Vesuvius has been belching forth molten lava that destroys everything in its path as it flows down the sides of the ancient volcano.

The official U. S. Navy photograph on the cover of this *SCIENCE NEWS LETTER* shows the volcano with its billowing clouds of black smoke.

At the latest count the death toll from the eruption totalled 26. Although residents of the Vesuvius area probably would be reluctant to believe it, the current eruption is not a very big one, from the long-range geological point of view. (See SNL, April 1)

Science News Letter, April 15, 1944

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• New Machines and Gadgets •

❁ **STATIC-RESISTANT** automobile tires, or tires which develop decreased electrical charges when the car is being driven, may soon be available. They are built, under a patented process, with a layer of rubber containing carbon black, or other electrically conductive material, underlying the tread. The layer concentrates the charge and leads it into the ground.

Science News Letter, April 15, 1944

❁ **EDIBLE RINDS** of oranges and other fruits can be removed and flaked by an improved grater which is operated with a crank in a table attachment. The orange is pressed by hand against the grater edges in this patented kitchen gadget. Curved grater cutting edges, spaced on the inside of a cup which the crank rotates, have slots between them through which the flecks of rind pass.

Science News Letter, April 15, 1944

❁ **FRICTION-METERS** have been constructed which measure mechanically the friction of fabric surfaces and evaluate fiber finishes and their resistance to slippage. Fabric purchasers are interested in smoothness, sheen, creep and wear-resistance; these are all associated with the fabric's frictional properties.

Science News Letter, April 15, 1944

❁ **AN IMPROVED** steerable parachute is used by "smoke-jumpers" in the U. S. Forest Service to reach forest fires in out-of-the-way places by airplane. Two rope-



controlled slots which extend from the parachute canopy are manipulated by the jumper, who can thus select a landing place. Photograph shows the chute in use.

Science News Letter, April 15, 1944

❁ **A TREATMENT** tent, just patented, is a tent within a tent which can be used for giving sun baths, heat and similar treatments. The inner tent has a row of sockets in which light and ray-emitting electric globes may be inserted. The inside walls of the inner tent are treated to reflect light and color on the body of the user.

Science News Letter, April 15, 1944

❁ **AN ELECTRICALLY** heated overcoat and portable storage battery which can easily be attached and detached is now patented. The current from the battery, carried in a small hand case, is turned on and off by the thumb with a switch on the handle. Electrical connections through plugs on the end of the sleeve break automatically when the case is set down.

Science News Letter, April 15, 1944

❁ **NEW CEMENT** has been developed to hold component lenses in field cameras. The cement will not discolor in extreme desert heat or in temperature as low as 60 degrees below zero. It is expected to replace natural Canadian balsam as a transparent lens cement.

Science News Letter, April 15, 1944

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 203.

BOOKS

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